

METHOD OF APPLYING LOCKING FUNCTION TO ELECTRONIC DOCUMENTS AND TEXT MESSAGES

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a method of applying locking function to an electronic document and/or a text message transmitted through the network, such as an electronic mail (e-mail) or message posted up on the bulletin, by which the security of electronic document and/or text message is ensured and the condition for opening and reading the electronic documents and/or text message is specified.

2. Description of the Related Art

With the development of the WWW (World Wide Web) and the explosive increase of TCP/IP (Transmission Control Protocol over Internet Protocol) - based Internet users, electronic documents such as an electronic mail or posting are widely being used for disseminating information,

FIG. 1A is a schematic diagram of a conventional electronic document transmission system, which includes an originating server **1** having a storage means **4**, a destination server **2** having a storage means **5**, first through Nth drafters **6a** through **6n**, first through Mth readers **7a** through **7m**, and the Internet **3** which connects the originating server **1** and the destination server **2**. In other words, if one of the first through Nth drafters **6a** through **6n** prepares an electronic document to be transmitted to the one or more receivers, the originating server **1** stores the electronic document transmitted from the sender in the storage means **4**, and then transmits the same to the destination server **2** to be stored in the storage

means 5 of the destination server 2. The first through Mth readers 7a through 7m can read the electronic document from the storage means 4 or 5 of the originating or destination server 1 or 2. The first through Nth drafters 6a through 6n can also read the electronic document.

FIG. 1B is a flow chart of a conventional process of posting a notice on an Internet site, the process consisting essentially of the steps of preparing a document (step 10) and reading the document (step 11). In other words, in step 10, a drafter connects to a predetermined Internet site on which one can post up a message, and prepares and posts up the message in the form of an electronic document. The server of the Internet site stores the message in its storage means. In step 11, the server of the Internet site allows the posted message to be fetched from the storage means to be read by anyone who connects to the Internet site. The posted message may be directly prepared on the Internet site or may have been prepared before connecting to the Internet site. As thus, the message posted on the Internet site is unrestrictedly open to the public that connects the bulletin board of the Internet site. Alternatively, in the case of a site run under subscription basis, the posted message is open to subscribers. Thus, there is no security means for the drafter to restrictedly allow only those who meet prescribed qualification or conditions to read the posted message.

FIG. 1C is a flowchart showing a conventional process of transmitting e-mail, comprising the steps of preparing an e-mail document (step 12), transmitting the e-mail document (step 13) and reading the e-mail document (step 14). In detail, in step 12, an e-mail sender prepares an e-mail document before or after connecting to the originating server 1 and supplies an e-mail receiver's address to the originating server 1. In step 13, the originating server 1 transmits the prepared e-mail document to the destination server 2 to be stored in the storage means 5 of the destination server 2, and the destination server 2 notifies

the arrival of e-mail to the receiver. When the e-mail receiver also uses the same originating server 1, the e-mail document is stored in the storage means 4 of the originating server 1. In step 14, the e-mail receiver can read the e-mail document immediately when the e-mail has arrived. That is to say, once the e-mail is transmitted from the sender, the receiver can read the e-mail without any restriction. Thus, even if the e-mail is erroneously transmitted, the e-mail sender cannot restrict the receiver from reading the e-mail. Also, an e-mail message posted onto the bulletin to inform ones of an event is generally transmitted a very long time before the event occurs. In this case, the receiver may forget when or where the event occurs. That is, the known methods do not provide a method for locking an electronic document.

SUMMARY OF THE INVENTION

To solve the above problem, it is an object of the present invention to provide a security means by which electronic documents and text messages are restrictedly given only to those who meet predetermined qualification or conditions.

It is another object of the present invention to provide a means for restricting reading an erroneously transmitted electronic document and text message.

To accomplish these and other objects described in the detailed description, there is provided a method of applying locking function to an electronic document over the Internet through a locking management server having a locked document storage means in which a locked document comprised of locking function selection region, a locking condition region, a locking guide message region, a hierarchy information region and an electronic document region, is stored, and a plain document storage means in which a plain electronic document is stored, comprising the steps of (1) preparing an electronic document, and (2) reading the electronic document, wherein the step (1) comprises preparing an electronic document and

storing hierarchy information, determining whether locking function is applied to the electronic document or not, enabling a locking condition and a locking guide message to be input if the locking function is selected, storing the electronic document in the locking document storage means if the locking function is selected, if not selected, storing the electronic document in the plain document storage means, and the step (2) comprises determining whether the electronic document to be read by the reader is locked or not, transmitting the electronic document to be read if not locked, enabling to input the locking condition if locked, allowing the reader to read the locked document if the locking condition is satisfied, and displaying the locking guide message if the locking condition is not satisfied.

The method of applying locking function to electronic documents according to the present invention can also be employed in transmission/reception of text messages through mobile phones. In this case, a message preparing step and a message reading step corresponding to an electronic document preparing step and an electronic document reading step, respectively, can be preferably performed in a text message management program loaded on a mobile phone.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and advantages of the present invention will be apparent in light of the following detailed description of an illustrative embodiment thereof, as illustrated in the accompanying drawings, in which:

FIG. 1A is a schematic diagram of a conventional electronic document (e-mail) transmission system;

FIG. 1B is a flowchart of a conventional process of posting up a message on an Internet site;

FIG. 1C is a flowchart of a conventional process of transmitting an e-mail;

FIG. 2A is a preferred embodiment of an electronic document transmission system with locking function according to the present invention;

FIG. 2B shows a structure of a locked document according to the present invention;

FIG. 3A is a flowchart of a process of applying locking function to an electronic document according to the present invention;

FIG. 3B is a flowchart of a process of transmitting the locked document shown in FIG. 3A to a destination server;

FIG. 3C is a flowchart of a process of reading the locked document shown in FIG. 3A, and

FIG. 4 is a schematic diagram showing a connection between mobile phones and a mobile communication network.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 2A showing a preferred embodiment of an electronic document transmission system with locking function according to the present invention, wherein the electronic document transmission system includes a locking function management server **20** and a destination server **21** having plain document storage means **23** and **25**, locked document storage means **24** and **26**, respectively, first through Nth drafters **27a** through **27n** that connect to the locking function management server **20**, first through Mth readers **28a** through **28m** that connect to the destination server **21**, and the Internet **22** through which the locking function management server **20** and the destination server **21** is connected. In detail, since the first through Nth drafters **27a** through **27n** may prepare a plain electronic document

(which is not locked) or a locked electronic document, the locking function management server **20** that has the capability of applying locking function to an electronic document, includes the plain document storage means **23** and the locked document storage means **24**, as described above. Also, if the destination server **21** is the one that has the capability of applying locking function to an electronic document, it may include the plain document storage means **25** and the locked document storage means **26**. If not, the destination server **21** may include only a plain electronic document storage means, like the storage means **5** shown in FIG. 1A, in which both the plain document and the locked document can be stored.

FIG. 2B shows a structure of a locked document according to the present invention, including a locking function selection region **200**, a locking condition region **201**, a locking guide message region **202**, a hierarchy information region **203**, and an electronic document region **204**. The locking function selection region **200** stores the information whether locking function is applied to the attached electronic document. For example, if the locking function selection region **200** is represented by 0, it implies that locking function is not applied to the document. If the locking function selection region **200** is represented by 1, it implies that locking function is applied thereto. Various conditions for locking the attached electronic document can be stored in the locking condition region **201**. For example, the date on which the attached electronic document can be open, the specified reader or questions for quiz can be provided. That is to say, if the date on which the attached electronic document can be open is set, e.g., 10:30 am 10-05-00 (dd-mo-yr), the attached electronic document cannot be open before the date. If the reader is specified, e.g., name, resident number, address, or the school from one graduated, the one other than the specified reader can not open the attached electronic document. If questions for quiz are suggested, a

predetermined quiz and the answer thereto, e.g., question “1+1” and answer “2”, are stored in the locking condition region **201**. The attached document can only be seen on condition that the correct answer is provided. If more than one locking methods are selected, locking conditions corresponding thereto can be stored successively. The locking guide message region **202** is a region necessary for presenting a guide message to anyone who does not satisfy the locking condition specified by the drafter. For example, if the reading commencement date has not been reached, a guide message saying “please wait.” is presented with the remaining time. If one who is not the specified reader tries to read the electronic document, a guide message saying “You are not the right person.” is presented. If the answer to the quiz is wrong, a guide message saying “Incorrect.” is presented. In the hierarchy information region **203**, the name of a drafter (or sender) who has prepared the locked document is stored. That is to say, the name (or ID) of the drafter who has prepared the locked document first is recorded in the hierarchy information region **203**. In the case when a reader who has read the locked document makes a reply to the locked document, the name of the reader is added after the drafter’s name stored in the hierarchy information region **203**. Likewise, names of readers who add more contents to the original document are stored in the hierarchy information region **203**.

FIG. 3A is a flowchart showing a process for applying locking function to an electronic document according to the present invention, comprising the steps of starting (step **300**), preparing an electronic document (step **301**), determining whether locking function is selected (step **302**), selecting locking function (step **303**), inputting a locking condition (step **304**), inputting a guide message (step **305**), storing an electronic document in a plain document storage means (step **306**), and storing an electronic document in locked document

storage means (step 307). In detail, in step 300, a drafter who intends to prepare a locked document must be in connection to or must be qualified for connection to the locking management server 20. In step 301, the drafter prepares an electronic document in the same way as conventional. In step 302, locking function provided from the locking management server 20 is selected. In step 303, the drafter selects at least one locking method among those provided from the locking management server 20 based on selection of locking function. In step 304, the locking management server 20 specifies a locking condition corresponding to the selected locking method, so that the drafter writes down the reading commencement date, the identifier of a specified reader or a predetermined quiz. In step 305, the drafter inputs the locking guide message according to applying locking function to the electronic document. In step 307, if locking function is applied to the electronic document, the electronic document is stored in the locked document storage means 24, and in step 306, if locking function is not applied to the electronic document, the electronic document is stored in the plain document storage means 23.

FIG. 3B is a flowchart of a process of transmitting the locked document shown in FIG.

3A to a destination server, the process including the steps of starting (step 310), determining whether a document to be transmitted is a locked document (step 311), determining whether a destination server can provide locking function (step 313), transmitting the document to a destination server (step 312), storing the locked document in a locking management server (step 314), transmitting the URL (Uniform Resource Locator) of the locking management server to the destination server (step 315) and transmitting the locked document to the destination server (step 316). In more detail, in the case where the stored locked document is to be transmitted with an electronic document, the transmission process shown in FIG. 3B

is performed. In step **311**, the locking management server **20** determines whether the document to be transmitted by the drafter is locked or not. If not locked, the step **312**, in which the document is transmitted in the same manner as a plain document is, is performed. If locked, the step **313** is performed. If the destination server **21** can provide locking function, the locking management server **20** transmits the locked document to the destination server **21** (step **316**). However, if the destination server **21** cannot provide locking function, even if the locked document is transmitted to the destination server **21**, the locked document cannot be opened. Thus, the locking management server **20** keeps the locked document to be stored in the locked document storage means **24** (step **314**). Instead, the Internet address of the locking management server **20** is transmitted to the destination server **21** (step **315**).

FIG. 3C is a flowchart of a process of reading the locked document shown in FIG. 3A, the process including the steps of determining whether an electronic document is locked or not (step **321**), reading the electronic document (step **322**), inputting a locking condition (step **323**), determining whether the locking condition is satisfied (step **324**), and displaying a locking guide message. In more detail, in the case where a reader intends to open an electronic document stored in the locking management server **20**, it is determined in step **321** whether the electronic document is a locked document or a plain document. If the electronic document is a plain document, it can be open in step **322**. In step **323**, if the electronic document is a locked document, the locking function selection region **200** in the structure of a locked document shown in FIG. 2B, is fetched by the locking management server **20** to present the locking condition, the answer to the locking condition is input by the reader or the current date is checked. In step **324**, it is determined whether the locking condition is satisfied by the input answer or the current date that is input or checked in step **323** satisfies

the locking condition. If the lock condition is satisfied (yes), the process goes to step **322**, in which the locked document is displayed to allow the reader to open and read the document. If the locking condition is not satisfied (no), the message stored in the locking guide message region (**202** of FIG. 2B) is shown to the reader. The plain electronic document and the locked electronic document are stored in the plain document storage means **23** and the locked document storage means **24** of the locking management server **20**, for example, posting up message on the Internet site or electronic transmission between the Intranet. Also, after step **322** shown in FIG. 3C, that is, when the reader who has read the locked document replies thereto after reading the document, hierarchy information of the locked document may be added. In other words, the reader's name may be added after the drafter's name in the hierarchy information region (**203** of FIG. 2B). FIG. 3C shows the reading step in the case where the drafter and the reader share one and the same locking management server. However, in the case where the drafter and the reader use different servers, for example, electronic transmission between different servers, that is, in the case where the step of transmitting the electronic document is further provided, as shown in FIG. 3B, when the reader connects to the destination server (**21** of FIG. 2A), the destination server **21** allows the reader to read the transmitted electronic document. In the case where the destination server **21** and the locking management server **20** is the same server, the process shown in FIG. 3C is performed. Here, the plain electronic document and the locked document are stored in the plain document storage means and the locked document storage means, respectively. If the destination server **21** cannot provide locking function, the step of the destination server **21** allowing the reader to connect to the locking management server **20**, the destination server **21**

having received the Internet address of the locking management server **20** transmitted in step **315** of FIG. 3B, may be further provided, before the reading process shown in FIG. 3C.

The method of applying locking function to electronic documents according to the present invention can be also employed in transmission/reception of text messages through mobile phones, and a preferred embodiment thereof will now be described in detail.

FIG. 4 is a schematic diagram showing a connection between mobile phones and a mobile communication network. Mobile phones **41** and **42** are connected to each other through a mobile communication network **50**, to utilize various services such as voice communication, transmission/reception of text messages or video communication. Here, the mobile communication network **50** is a network constructed of components necessary for mobile communication services, including a base transmission station for wireless communication with mobile phones, a base station controller, a mobile switch center, a short message service server and so on. Text message management programs **41-1** and **41-2** are loaded on the respective mobile phones **41** and **42**, and perform a message preparation step and a message reading step to be described below.

For the convenience sake of explanation, text message transmission and reception between mobile phones will now be described referring back to the same drawings as described above. Since what are transmitted and/or received through mobile phones are text messages, the term "electronic documents" throughout the description set forth above and the above drawings, is intended to mean "text messages" herein.

A structure of a locked text message transmitted and/or received through the mobile phones **41** and **42** according to the present invention is the same as that of FIG. 2B. That is, the structure of a locked text message includes a locking function selection region **200**, a

locking condition region **201**, a locking guide message region **202**, a hierarchy information region **203**, and a text message region **204**. The locking function selection region **200** stores the information whether locking function is applied to the text message. For example, if the locking function selection region **200** is represented by 0, it implies that locking function is not applied to. If the locking function selection region **200** is represented by 1, it implies that locking function is applied to. Various conditions for locking the text message can be stored in the locking condition region **201**. For example, the date on which the text message can be open, the specified reader or questions for quiz can be provided. That is to say, if the date on which the text message can be open is set, e.g., 10:30 am 10-05-00 (dd-mo-yr), the text message cannot be open before the date. If the reader is specified, e.g., name, resident number, address, or the school from one graduated, the one other than the specified reader can not open the locked text message. If questions for quiz are suggested, a predetermined quiz and the answer thereto, e.g., question "1+1" and answer "2", are stored in the locking condition region **201**. The locked text message can only be seen on condition that the correct answer is provided. If more than one locking methods are selected, locking conditions corresponding thereto can be stored accordingly. The locking guide message region **202** is a region necessary for presenting a guide message to anyone who does not satisfy the locking condition specified by the drafter. For example, if the reading commencement date has not been reached, a guide message saying "please wait." is presented with the remaining time. If one who is not the specified reader tries to read the text message, a guide message saying "You are not the right person." is presented. If the answer to the quiz is wrong, a guide message saying "Incorrect." is presented. In the hierarchy information region **203**, the name of a drafter who has prepared the locked text message is

stored. That is to say, the name (or ID) of the drafter who has prepared the locked text message first is recorded in the hierarchy information region **203**. In the case when a reader who has read the locked text message makes a reply to the locked text message, the name of the reader is added after the drafter's name stored in the hierarchy information region **203**.
5 Likewise, names of readers who add more contents to the original document are stored in the hierarchy information region **203**. The text message region **204** stores the text message to be transmitted.

Then, a process of applying locking function to a text message according to the present invention will be explained in detail in reference to FIGS. 3A and 3C.

First, referring to FIG. 3A, in step **301**, the drafter who intends to transmit a text message prepares the text message in the same way as conventional. In step **302**, locking function provided from the text message management program **41-1** and displayed on the screen of the mobile phone **41** is selected. In step **303**, the drafter selects at least one locking method among those provided from the text message management program **41-1** based on
15 selection of locking function. In step **304**, the text message management program **41-1** specifies a locking condition corresponding to the selected locking method, so that the drafter writes down the reading commencement date, the identifier of a specified reader or a predetermined quiz. In step **305**, the drafter inputs the locking guide message according to applying locking function to the text message. In step **307**, if locking function is applied to
20 the text message, the text message with information on the selected locking method, a locking condition and locking guide message attached thereto is stored in a predetermined storage area (not shown), and in step **306**, if locking function is not applied to the electronic document, the text message is stored in another predetermined storage area (not shown).

The prepared text message is transmitted to a receiver's mobile phone 42 via the mobile communication network 50.

Next, referring to FIG. 3C, a process of reading the locked text message will be explained in detail.

5 In step 321, the text message management program 42-1 checks whether the text message has the locking function set thereto if the text message received in the receiver's mobile phone 42 is intended to read. If the text message is a plain text message, it can be open in step 322. In step 323, if the text message is a locked text message, the locking function selection region 200 in the structure of a locked text message shown in FIG. 2B, is fetched by the text message management program 42-1 to present the locking condition, the answer to the locking condition is input by the reader or the current date is checked. In step 324, it is determined whether the locking condition is satisfied by the input answer or the current date that is input or checked in step 323 satisfies the locking condition. If the lock condition is satisfied (yes), the process goes to step 322, in which the locked text message stored in the text message region 204 is displayed to allow the reader to open and read the text message. If the locking condition is not satisfied (no), the message stored in the locking guide message region (202 of FIG. 2B) is shown to the reader.

10 In the above-described embodiment, the text message preparing and reading steps are performed by the text message management program loaded on the mobile phone. However, 20 in the case where a text message is transmitted and/or received by means of wireless internet services, a wireless internet server can act as the text message management program. In other words, the drafter who intends to transmit a locked text message connects to the wireless internet server and prepares a text message according to the content of services

provided by the wireless internet server. The wireless internet server transmits the prepared text message to the receiver's mobile phone if the text message received in the receiver's mobile phone is intended to read to cause the text message reading step to be performed. Since the wireless internet server performs the same operation as the locking management server in FIG. 2A, the detailed explanation thereof will be avoided.

As described above, according to the present invention, locking function is applied to an electronic document and/or a text message, thereby maintaining the security of information between the drafter and reader of the electronic document and/or text message. Also, since the security of the electronic document and/or text message can be maintained for a predetermined period of time, another electronic document and/or text message containing different information can be newly transmitted before the lapse of the predetermined period of time. Further, in the event that a drafter erroneously transmits an electronic document and/or text message, that is, when a wrong electronic document and/or text message receiver is specified, since the electronic document and/or text message cannot be opened, only the drafter's intended receiver can read the electronic document and/or text message.